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High-level expression and purification of the major birch pollen allergen, Bet v 1.

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Bet v 1, the single major allergen from birch pollen, shares IgE epitopes with all major tree pollen allergens from closely related species such as alder, hazel, hornbeam, beech, and European chestnut. Because of high sequence homologies among these allergens and the well-studied cross-reactivities on B cell epitopes, Bet v 1 is a representative model protein which can be used for in vitro studies. The cDNA coding for Bet v 1, the single major allergen from birch pollen, was cloned into the T7-based Escherichia coli expression system pMW 175/BL21(DE3) and synthesized as a nonfusion protein. In contrast to other E. coli systems (e.g., pKK233-2/JM105), this system produces high levels of readily extractable proteins corresponding to 5-10% of E. coli total protein, the percentage varying with culture conditions. The overall yield was 8-10 mg of purified recombinant protein per liter of culture medium. The recombinant allergen was purified by several steps, including ion-exchange and hydrophobic interaction chromatography. The purified recombinant allergen showed identical immunological properties with the respective natural counterpart. The use of recombinant allergens of high purity is expected to result in more accurate diagnostic procedures, but possibly also in a superior immunotherapy of Type I allergic diseases when compared with methods using crude allergen extracts containing various amounts of allergen concentrations.

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